are contained an interesting historical *résumé* of the development of milling processes, which in turn is followed by a detailed description of wheat-storing buildings, silos, elevators and the like. The whole process of wheat cleaning, both by dry and wet methods, is described. In the next place, there is an account of the reduction of grain to flour, both by the old mill-stone process and the more modern one of gradual reduction by means of roller mills. The plan-sifter and other methods of separating flour from bran and germ next occupy attention. Having thus traced the whole operation from the raw grain to the finished flour, the authors devote a concluding chapter to flour analysis, modes of preservation, and a description of the channels through which, as a matter of commerce, it reaches the consumer. Of particular interest in this connection is the description of the "Twelve Marks" Market of Paris, and its mode of classifying and valuing flour according to a carefully selected standard of quality.

That M. Girard did not live to see the completion of his work is a matter sincerely to be regretted, but M. Lindet is to be congratulated on having produced, from the materials placed at his disposal and his own researches, a work of the keenest interest to chemists, and one that should prove of great value to the milling industry.

WILLIAM JAGO.

PHYSIOLOGICAL RESULTS.

Ergebnisse der Physiologie. Erster Jahrgang. II. Abteilung. Biophysik und Psychophysik. Pp. xviii+926. (Wiesbaden: Bergmann.) Price 25 marks.

IN the present day, when the man of science is becoming more and more overwhelmed by the ever-increasing flood of literature, any methods which can assist him in some degree to surmount the flood may cordially be welcomed. Year-books and Centralblätter are useful in affording abstracts of current literature, but such abstracts, necessarily disconnected, are apt to engender disconnection and incompleteness of thought in their readers. Moreover, mixed fragments of literature are exceedingly difficult to assimilate, in comparison with connected and critical surveys extending over a definite range of some stated subject. We must therefore express our warm approval at the publication of the first volumes of this new physiological annual. As the name might imply, this "Ergebnisse der Physiologie" is comparable in character to the well-known "Ergebnisse der Anatomie und Entwickelungsgeschichte," which has proved of great service to zoologists, and to the no less valuable "Ergebnisse der allgemeinen Pathologie." In the words of the editors (L. Asher and K. Spiro), the present "Ergebnisse" will consist of original and critical essays upon various subjects or special points in physiology, which as the result of fresh research have acquired an especial interest. As the "Ergebnisse" will appear annually, they hope that in course of time as far as possible every branch of the science will receive its due attention.

With this commendation, we may perhaps be permitted to offer some little criticism as to the range of subjects which the editors propose to include within their jurisdiction. Dealing only with what they term "Biophysik" and "Psychophysik," with which the volume under review is alone concerned (and which represent only half the complete annual), it appears that in addition to purely physiological matters, the editors intend to include essays covering a wide range of general physiology. The physiology of protoplasm is, of course, quite rightly included, but it is distinctly open to question whether biological problems such as inheritance and adaptation had not better be omitted. The present volume of "Ergebnisse," for instance, includes a very long article on Regeneration, although this subject is dealt with regularly every year in the aforementioned "Ergebnisse der Anatomie." Again, the editors intend to include articles on physiological psychology (*e.g.* simple psychical processes, reaction time, sleep, hypnotism). All these extraneous subjects go to swell the size of the volumes, and render them unwieldy. Thus this first year's issue runs to two volumes of about 900 pages each, or double the bulk of the anatomical "Ergebnisse," which in its earlier numbers much more reasonably confined itself to a single volume of about 700 pages. There must be many a working physiologist who would gladly subscribe to a volume of this character, but who would be deterred by the bulkiness and expense of the present issue. Moreover, it is difficult to see how the multiplication of articles in the present "Ergebnisse" can be kept up in the future, unless special points be dealt with in wholly unnecessary detail. So great is the total amount of ground covered that it almost seems as if one or two more years' issues would include the whole range of physiology. Subsequent essayists would accordingly have to rely almost entirely on new work, or their articles would practically resolve themselves into year-book abstracts. It is to be hoped, therefore, that the editors may see fit in future years to curtail the size of their volumes. This should be done, not only by diminishing the number of articles, but by diminishing their length. Many of the essays in the present volume, as, for instance, those of Prof. Tigerstedt on intracardial pressure, of Prof. Starling on the movements and innervation of the alimentary canal, and of Prof. Hensen on the physiology of hearing, are of a moderate and most convenient length; but others, such as those of C. v. Monakow on cortical localisation (132 pages), of A. Tschermak on adaptation of the eye to light, and the function of the rods and cones (106 pages), and of F. B. Hofmann on vision as affected by strabismus (46 pages), must be regarded as unnecessarily detailed, admirable as they may be in themselves. On the other hand, one or two articles err on the side of brevity, especially that of H. Boruttau on the innervation of respiration (6 pages), and to a less extent that of H. Meyer on nerve and muscle poisons (15 pages).

Another matter deserving of criticism is one which in future issues will doubtless to some extent be rectified. It concerns the lack of uniformity in the treatment of their subjects observed by the various essayists.

This is especially noticeable as regards the bibliography. Many of the essayists hit a happy mean, but H. Przibram actually gives 31 pages of references in his 77-page article on regeneration, whilst v. Monakow gives 846 distinct references, occupying 27 pages. Prof. Biedermann sins in the opposite direction, and in his otherwise comprehensive and instructive article on electrophysiology, sometimes mentions authors without giving any clue to their papers. Again, several of the articles are well illustrated (especially v. Monakow's important article on cortical localisation, which has eight plates), and it would be well if this most useful feature could be extended to certain other of the articles, though doubtless the question of expense comes in here.

In the limits of a short notice like the present one, it is impossible even to mention the titles of all the essays, but reference may be permitted to a few, over and above those already cited. P. Jensen gives a useful description of protoplasmic movement, and the effects of external conditions upon it, whilst J. von Uexküll writes a philosophical essay on the psychology of the lower animals. O. Langendorff enters very thoroughly into the properties of cardiac muscle, and discusses the nature of heart contraction, whether nervous or myogenic. L. Asher treats of certain aspects of the vaso-motor system, and R. du Bois-Reymond deals fully with the mechanics of respiration. H. E. Hering writes at some length on the central nervous paralysis of skeletal muscles (*e.g.* reflex inhibition, antagonistic muscles, decerebrate rigidity), whilst P. Grützner treats of the voice and speech, and H. Zwaardemaker of smell.

Finally, a word of praise must be accorded to the admirable manner in which the volume is printed. The large and well interspaced type renders reading a pleasure. Also printer's errors are remarkably infrequent. H. M. VERNON.

PHYSICAL CHEMISTRY AND BIOLOGY.

Physikalische Chemie der Zelle und der Gewebe. Von Dr. Rudolf Höber, Privatdocent der Physiologie an der Universität Zürich. Pp. xii + 344. (Leipzig: W. Engelmann.) Price 9*s.* net.

THE keynote to this interesting volume is found in the beautiful quotation from von Humboldt with which the author introduces his preface.

"Es ist die Sitte derer, die gerne andere auf den Gipfel der Berge führen möchten, dass sie den Mitreisenden den Weg gebahnter und anmutiger schildern, als man ihn finden wird, und dass sie die Aussicht von den Bergen rühmen, auch wenn sie ahnen, dass ganze Teile der Gegend in Nebel verhüllt bleiben werden. Sie wissen, dass auch in dieser Verhüllung ein geheimnissvoller Zauber liegt, dass eine duftige Ferne den Eindruck des Sinnlich-Unendlichen hervorruft, ein Bild, dass im Geist und in den Gefühlen sich ernst und ahnungsvoll spiegelt."

The author proves himself in the subsequent pages of the volume just such an inspiring guide as this, and points out the varied prospects from many points of view in his different chapters.

The book is interestingly written throughout, and although space makes it impossible to mention all recent work in the applications of the new advancements of physical chemistry to biology, the work is thoroughly up to date in most important directions of this extensive field of research.

The author states in his preface that the book is intended as a first review of the subject for those who may subsequently study in larger text-books, and be stimulated thereby to aid in its development; but, in the opinion of the reviewer, the book will be found most interesting to those who already possess a considerable acquaintance with physical chemistry, and desire a comprehensive and suggestive review of its relationship to biology and physiology.

Parts of the subject, such, for example, as the development of the ionic theory, and equilibrium in solution, are from the size of the book presented in such concise form as to make anything but easy reading for a beginner at the subject; while others, such as the permeability of the cell membrane, the physical theory of the action of anæsthetics, absorption, secretion and lymph formation, form attractive reading, and demand little special previous knowledge of the subject.

The physical chemist owes to the biologist the earliest experimental work upon osmotic pressure and its relationship to molecular weight. It was the study of osmosis and osmotic pressure by Pfeffer and Traube on account of its relationship to cell life which chiefly led to the conception that substances in solution behave in certain respects like gases, and this formed the starting point for the physical chemistry of solutions.

For this early service biologists are now being repaid by the great opportunities which increased knowledge of physical chemistry is giving in the prosecution of the study of the chemical and physical processes taking place in the cell.

In this development of biology based on physical chemistry, the work is not being done solely by physical chemists, on the one hand, or by biologists on the other, but important contributions have been and are being made to the common store by both biologists and physical chemists. A perusal of the book before us demonstrates most clearly this mutual relationship between physical chemistry and biology, for in the names of authors one finds those both of important biologists and physical chemists.

It is along this line of physical chemistry, so far as one can foresee, that the most important and rapid growth in biology will take place in the near future, and hence it is most important for either following or taking a share in these developments that every biologist should also be acquainted with recent progress in physical chemistry. Certain portions of the book may specially be recommended to those who desire in a short space to learn something of the close practical relationship of physical chemistry to biology and also to medicine, such as that on the solubility of uric acid, urates, and the purin bodies, and on the action of indicators, pp. 88 to 101; the permeability of the cell-membrane, especially that portion dealing with the action of anæsthetics, pp. 101 to 134; action of ions upon cells, pp. 134 to 146, and 171 to 184; methods of